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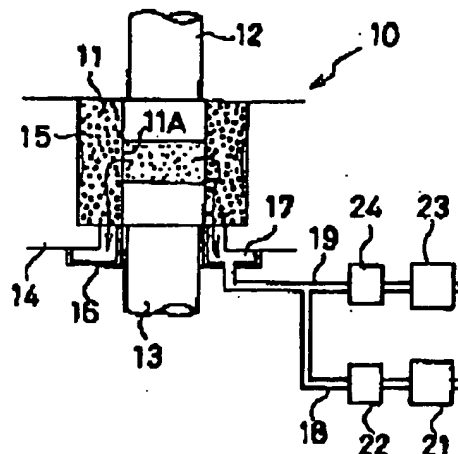
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TITLE : DIE AND METHOD FOR POWDER  
COMPRESSION MOLDING



**ABSTRACT :** **PURPOSE:** To improve air-vent property in powders by constituting the powder contact part of a die of a porous body having pores communicating with the inside and the outside of the mold.

**CONSTITUTION:** A powder compression molding die 10 is constituted of a mortar 11 and upper and lower rods 12, 13. After filling powders in the mortar 11 for which the lower rod 13 is inserted and arranged in a prescribed position, the upper rod 12 is inserted into the mortar 11 for the compression molding of the powders, and a molded article is pushed up by the lower rod 13 outside the mortar 11 to be discharged. Here, the mold 10 is constituted of a metallic porous body 15 for the whole body including the powder contact part 11A of the mortar 11. At the unfilled time of powders into the die 10, a pressurized fluid is applied through a pressure chamber 17 to the outside surface of the die that is constituted of the porous body 15, and the powders filling the pores of the porous body 15 are blown away inside the die. Consequently, the positional relation to constitute the die, e.g. between the mortar and the rods is set freely.

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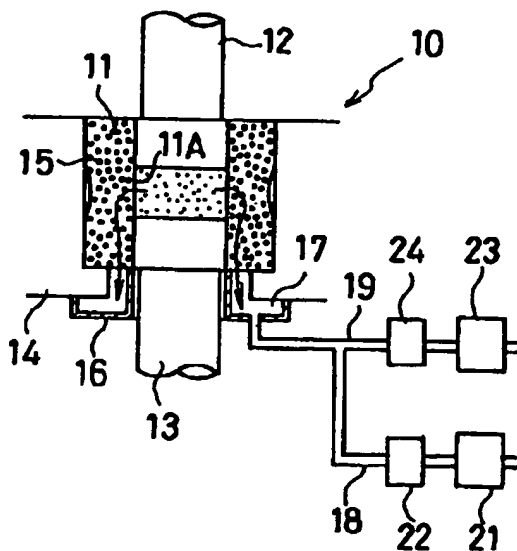
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(54)【発明の名称】 粉体圧縮成型型及び方法

(57)【要約】

【目的】 粉体を圧縮成型するに際し、粉体中の空気抜き性を良好とするとともに、成型型を構成する例えば臼と杵の位置関係を自由に設定可能とすること。

【構成】 粉体圧縮成型型10において、型(臼11)の少なくとも接粉部11Aが、該型の内外に連通する孔を備えた多孔質体15からなるもの。



## 【特許請求の範囲】

【請求項1】 粉体圧縮成形型において、型の少なくとも接粉部が、該型の内外に連通する孔を備えた多孔質体からなることを特徴とする粉体圧縮成形型及び方法。

【請求項2】 請求項1に記載の粉体圧縮成形型を用いる粉体圧縮成形方法において、型への粉体の非充填時に、多孔質体からなる型外面に加圧流体を印加し、多孔質体の孔内の目詰まり粉を型内に吹出すことを特徴とする粉体圧縮成形方法。

【請求項3】 請求項2に記載の粉体圧縮成形方法において、更に、型への粉体の充填及び成形時に、多孔質体からなる型外面に吸引粒体を印加し、多孔質体の孔を介して型内の空気を強制排気することを特徴とする粉体圧縮成形方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、入浴剤、薬剤、食品等の粉体を圧縮成形する粉体圧縮成形型及び方法に関する。

## 【0002】

【従来の技術】従来、粉体圧縮成形型として、特開昭62-230500号公報に記載の如くのもの提案されている。この従来技術は、図4に示す如く、臼1、及び上下の杵2、3を成形型として用いるものであり、下杵3を所定位置に挿入配置された臼1に粉体を充填した後、上杵2を臼1内に挿入して粉体を圧縮成形し、圧縮成形された成形品を下杵3により臼1の外に押し上げて排出するものである。

【0003】このとき、上述の圧縮成形作業は、粉体内に含まれている空気を成形型の外部に押出す作業であるが、空気抜き経路は臼1と杵2、3との微細隙隙にのみ限られており、空気抜きの悪い粉体や空気含有量の多い粉体を高速成形する場合には空気の押し出しが十分行なわれないまま圧縮成形されてしまう。このため、粉体はある程度多量の空気を含んだまま無理やり圧縮成形され、成形後に成形品内に残存する空気の反発力が該成形品の表面剥離（キャッピング現象）をひき起こす。

【0004】そこで、上述の図4の従来技術では、臼1の下杵3に臨む内面を外部空間に連通する空気抜き孔4を備え、成形時における粉体からの空気抜きの向上を図っている。

## 【0005】

【発明が解決しようとする課題】然しながら、従来技術には、下記①、②の問題点がある。

【0006】①空気抜き孔4は臼1の接粉部に開口されるものでなく、下杵3に臨んで設けられるものであるに過ぎない。このため、粉体中の空気は依然として臼1と杵2、3との微細隙隙のみを通過して押出されるものであるに過ぎず、空気抜きの確実を図ることに困難があり、キャッピング現象を十分には防止できない。従っ

て、特に、空気抜きの悪い粉体や空気含有量の多い粉体については、高速度、高圧縮比での成形性が悪い。

【0007】②臼1に対する空気抜き孔4の位置が、下杵3に臨む位置に限定されるため、成形時の臼1と下杵3との位置関係が拘束されてしまう。

【0008】本発明は、粉体を圧縮成形するに際し、粉体中の空気抜き性を良好とするとともに、成形型を構成する例えば臼と杵の位置関係を自由に設定可能とすることを目的とする。

## 10 【0009】

【課題を解決するための手段】請求項1に記載の本発明は、粉体圧縮成形型において、型の少なくとも接粉部が、該型の内外に連通する孔を備えた多孔質体からなるようにしたものである。

【0010】請求項2に記載の本発明は、請求項1に記載の粉体圧縮成形型を用いる粉体圧縮成形方法において、型への粉体の非充填時に、多孔質体からなる型外面に加圧流体を印加し、多孔質体の孔内の目詰まり粉を型内に吹出すようにしたものである。

20 【0011】請求項3に記載の本発明は、請求項2に記載の粉体圧縮成形方法において、更に、型への粉体の充填及び成形時に、多孔質体からなる型外面に吸引粒体を印加し、多孔質体の孔を介して型内の空気を強制排気するようにしたものである。

## 【0012】

【作用】請求項1に記載の本発明によれば、下記①、②の作用がある。

【0013】①空気抜き孔として機能し得る孔を備えた多孔質体にて型の接粉部を構成したから、粉体中の空気を該粉体回りから直接的に型外へと排出できる。そして、孔は多孔質体により多数形成されるから、その空孔率（接粉部の総表面積に対する総孔面積の割合）に応じた高い空気抜き性を確保できる。従って、空気抜きの悪い粉体や空気含有量の多い粉体についても、高速度、高圧縮比で、キャッピング現象を生ずることのない圧縮成形性を確保できる。

【0014】②型の接粉部を多孔質体にて構成し、粉体をこの多孔質体に直接的に接触せしめるものである限り、型を構成する例えば臼と杵の位置関係を特定位置に拘束する必要がなく、自由に設定できる。

【0015】請求項2に記載の本発明によれば、下記③の作用がある。

③粉体の非充填時に、多孔質体からなる、型外面に加圧流体を印加し、多孔質体の孔内の目詰まり粉を型内に吹出すことにより、上述①の空気抜き性を常時安定維持できる。

【0016】請求項3に記載の本発明によれば、下記④の作用がある。

④粉体の充填及び成形時に、多孔質体からなる型外面に吸引流体を印加し、多孔質体の孔を介して型内の空気を

強制排気することにより、上述①の空気抜き性をより向上できる。

【0017】

【実施例】図1は第1実施例を示す模式図、図2は第2実施例を示す模式図、図3は第3実施例を示す模式図、図4は従来例を示す模式図である。

【0018】(第1実施例)(図1)

粉体圧縮成型型10は、臼11、及び上下の杵12、13を有して構成され、下杵13を所定位置に挿入配置された臼11に粉体を充填した後、上杵12を臼11内に挿入して粉体を圧縮成形し、圧縮成形された成形品を下杵13により臼11の外に押し上げて排出する。尚、臼11は臼固定ホルダ14に固定されている。

【0019】ここで、成型型10にあっては、臼11の接粉部11Aを含む全体を金属多孔質体15にて構成している。即ち、多孔質体15は臼11の接粉部11Aの内面を形成するとともに、大気へ直接又は間接に開放される。そして、多孔質体15は、臼11の内外に連通する孔を備えており、該孔の孔径を粉体粒径より小としている。

【0020】具体的には、粉体平均粒径を100～200 $\mu$ mとすると、多孔質体15の平均孔径を1～10 $\mu$ m、空孔率(総表面積に対する総孔面積の割合)を20～30%とするのが好適である。上記平均粒径の粉体としては、例えば主成分を炭酸水素ナトリウム、炭酸ナトリウム、コハク酸、及びフマル酸とする溶剤がある。また、上記平均孔径、空孔率の金属多孔質体としては、例えばポーセラックスII(新東工業(株)の商品名)がある。

【0021】また、成型型10にあっては、臼11及び臼固定ホルダ14の下端外面回りに圧力室ハウジング16を封着し、臼11の下端面回りに圧力室17を画成している。

【0022】そして、圧力室17に加圧空気を印加するための加圧空気供給管18と、圧力室17に吸引空気を印加するための吸引空気供給管19とを接続している。

【0023】加圧空気供給管18は空気圧縮機等の加圧空気発生器21を圧力室17に切換接続するための切換弁22を備え、吸引空気供給管19は真空ポンプ等の吸引空気発生器23を圧力室17に切換接続するための切換弁24を備えている。

【0024】以下、成型型10による成型動作について説明する。

(1) 臼11内の所定位置に下杵13を挿入配置し、臼11内に所定量の粉体を充填する。

【0025】(2) 上杵12を待機位置から臼11内に挿入して上記粉体を圧縮成形する。この圧縮成形後、上杵12は臼11の外の特機位置に引き戻される。

【0026】(3) 圧縮成形された成形品を下杵13により臼11の外に押し上げて排出する。この成形品排出後、下杵13は臼11内の所定位置に再設定される。

【0027】尚、成型型10にあっては、臼11への粉体の非充填時に、加圧空気発生器21が発生する加圧空気を加圧空気供給管18から圧力室17に供給することにより、多孔質体15の外面にこの加圧空気を印加し、多孔質体15の孔内の目詰まり粉を臼11内に吹出す。

【0028】また、成型型10にあっては、臼11への粉体の充填及び成形時に、吸引空気発生器23が発生する吸引空気を吸引空気供給管19から圧力室17に供給することにより、多孔質体15の外面にこの吸引空気を印加し、多孔質体15の孔を介して臼11内の空気を強制排気する。

【0029】尚、図中の矢印は加圧空気、吸引空気の流れを示す。成形時に臼11から排出される空気は、臼11の下端面から圧力室17の側へ排出されるだけでなく、臼11の上端面からも大気中へと直接排出される。

【0030】以下、本実施例の作用について説明する。①空気抜き孔として機能し得る孔を備えた多孔質体15にて臼11の接粉部11Aを構成したから、粉体中の空気を該粉体回りから直接的に型10の外へと排出できる。そして、孔は多孔質体15により多数形成されるから、臼11の空孔率(接粉部11Aの総表面積に対する総孔面積の割合)に応じた高い空気抜き性を確保できる。従って、空気抜けの悪い粉体や空気含有量の多い粉体についても、高速度、高圧縮比で、キャッピング現象を生ずることのない圧縮成形性を確保できる。

【0031】②臼11の接粉部11Aを多孔質体15にて構成し、粉体をこの多孔質体15に直接的に接触せしめるものである限り、型10を構成する臼11と杵12、13の位置関係を特定位置に拘束する必要がなく、自由に設定できる。

【0032】③粉体の非充填時に、多孔質体15からなる臼11の外面に加圧空気を印加し、多孔質体15の孔内の目詰まり粉を臼11内に吹出すことにより、上述①の空気抜き性を常時安定維持できる。

【0033】④粉体の充填及び成形時に、多孔質体15からなる型11の外面に吸引空気を印加し、多孔質体15の孔を介して型10内の空気を強制排気することにより、上述①の空気抜き性をより向上できる。

【0034】(第2実施例)(図2)

粉体圧縮成型型30が、前記図1の成型型10と異なる点は、臼11の下端外面回りの圧力室17、加圧空気供給管18、吸引空気供給管19を撤去したことにある。

【0035】この成型型30によれば、臼11が多孔質体15にて構成されることから、前記成型型10における①、②の作用を有する。尚、図中の矢印は排出空気の流れを示す。

【0036】(第3実施例)(図3)

粉体圧縮成型型40が、前記成型型10と異なる点は、臼11の下端外面回りの圧力室17、加圧空気供給管18、吸引空気供給管19を撤去したこと、及び臼11の

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みでなく、杵12、13も金属多孔質体15によって構成したことにある。

【0037】この成形型40によれば、成形時に、粉体中の空気を該粉体回りから直接的に外部へと排出する空気抜き領域を、粉体の全周に渡るように拡張するものとなり、多孔質体15を用いたことによる空気抜き性をより向上できる。尚、図中の矢印は排出空気の流れを示す。

【0038】然るに、本発明の実施においては、型の少なくとも接粉部のみを多孔質体によって形成するものであれば良く、例えば上記各実施例において臼11、杵12、13の全体を多孔質体にて形成することを必須とせず、臼11、杵12、13の一部のみを多孔質体にて形成するものであっても良い。

【0039】また、本発明の実施においては、型の外面の一部に限らず、型外面の全部に加圧流体を印加し、或いは吸引流体を印加するものであっても良い。

【0040】また、本発明の実施において、成形型は臼と上下の杵とからなるものに限らず、凹型と凸型の如く

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により構成されるものであっても良い。

【0041】

【発明の効果】以上のように本発明によれば、粉体を圧縮成形するに際し、粉体中の空気抜き性を良好とするとともに、成形型を構成する例えば臼と杵の位置関係を自由に設定可能とすることができる。

【図面の簡単な説明】

【図1】図1は第1実施例を示す模式図である。

【図2】図2は第2実施例を示す模式図である。

【図3】図3は第3実施例を示す模式図である。

【図4】図4は従来例を示す模式図である。

【符号の説明】

10 粉体圧縮成形型

11 臼

11A 接粉部

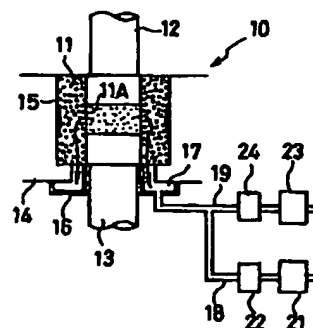
12、13 杵

15 多孔質体

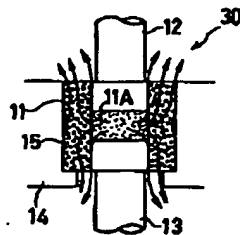
18 加圧空気供給管

19 吸引空気供給管

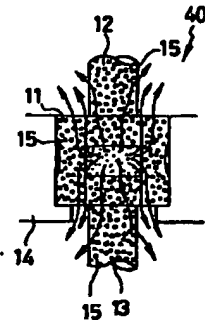
【図1】



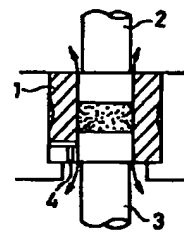
【図2】



【図3】



【図4】



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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the fine-particles compression-molding mold and approach of pressing fine particles, such as a close bath liquid, drugs, and food.

[0002]

[Description of the Prior Art] Conventionally, the thing is proposed by JP,62-230500,A like the publication as a fine-particles compression-molding mold. the thing using a mortar 1 and the up-and-down pestles 2 and 3 as a die as this conventional technique is shown in drawing 4 -- it is -- lower -- after filling up with fine particles the mortar 1 by which insertion arrangement was carried out in the pestle 3 in the predetermined location -- the upper -- the mold goods by which inserted the pestle 2 into the mortar 1, and pressed fine particles, and compression molding was carried out -- lower -- it pushes up out of a mortar 1 with a pestle 3, and discharges.

[0003] Although an above-mentioned compression-molding activity is an activity which extrudes the air included in fine particles to the exterior of a die at this time, the path of an air vent is restricted only to the detailed gap of a mortar 1 and pestles 2 and 3, and when carrying out high velocity forming of the bad fine particles of an air omission, or the fine particles with many quantities of contained air, while extrusion of air has not been enough performed by it, compression molding of it will be carried out. For this reason, compression molding of the fine particles is carried out forcibly, with to some extent a lot of air included, and the repulsive force of the air which remains in mold goods after shaping causes surface exfoliation (capping phenomenon) of these mold goods.

[0004] So, with the conventional technique of above-mentioned drawing 4 , it has the air bleed hole 4 which opens for free passage the inner surface which attends a pestle 3 under a mortar 1 to outer space, and improvement in the air vent from the fine particles at the time of shaping is in drawing.

[0005]

[Problem(s) to be Solved by the Invention] However, there is a trouble of the following \*\* and \*\* in the conventional technique.

[0006] \*\* that by which opening of the air bleed hole 4 is carried out to \*\*\*\*\* of a mortar 1 -- it is not -- lower -- it is faced and prepared in a pestle 3 -- it is not alike too much. for this reason, the thing which the air in fine particles still passes only through the detailed gap of a mortar 1 and pestles 2 and 3, and is extruded -- it is -- it does not pass, but difficulty is shown in planning authenticity of an air vent, and a capping phenomenon cannot fully be prevented. Therefore, about especially the bad fine particles of an air omission and fine particles with many quantities of contained air, the moldability in high speed and a high compression ratio is bad.

[0007] \*\* the location of the air bleed hole 4 to a mortar 1 -- lower -- since it is limited to the location which attends a pestle 3 -- the mortar 1 at the time of shaping -- lower -- physical relationship with a pestle 3 will be restrained.

[0008] This invention aims at the thing which constitute a die and for which setting out of the physical relationship of a mortar and a pestle is enabled freely, for example while it is faced pressing fine particles and makes good air vent nature in fine particles.

[0009]

[Means for Solving the Problem] It is made for this invention according to claim 1 to consist of a porous body which \*\*\*\*\* equipped with the hole of a mold which is open for free passage within and without this mold at least in a fine-particles compression-molding mold.

[0010] This invention according to claim 2 impresses an application-of-pressure fluid to the mold outside surface which consists of a porous body at the time of being un-filled [ of the fine particles to a mold ] up, and the blinding powder in the hole of a porous body is made to blow off in a mold in the fine-particles compression-molding approach of using a fine-particles compression-molding mold according to claim 1.

[0011] In the fine-particles compression-molding approach according to claim 2, this invention according to claim 3 impresses attraction grain to the mold outside surface which consists of a porous body at the time of restoration of the

fine particles to a mold, and shaping further, and is made to carry out the forcible exhaust air of the air in a mold through the hole of a porous body.

[0012]

[Function] According to this invention according to claim 1, there is an operation of the following \*\* and \*\*.

[0013] \*\* Since \*\*\*\*\* of a mold was constituted from a porous body equipped with the hole which may function as an air bleed hole, the air in fine particles can be directly discharged out of a mold from the circumference of these fine particles. And since many holes are formed of a porous body, they can secure the high air vent nature according to the void content (the total hole to the total surface area of \*\*\*\*\* area comparatively). Therefore, the compression-molding nature which does not produce a capping phenomenon is securable with high speed and a high compression ratio also about the bad fine particles of an air omission, or fine particles with many quantities of contained air.

[0014] \*\* As long as it constitutes \*\*\*\*\* of a mold from a porous body and fine particles are made to contact this porous body directly, it is not necessary to restrain the physical relationship of the mortar which constitutes a mold, and a pestle in a specific location, and it can be set up freely.

[0015] According to this invention according to claim 2, there is an operation of the following \*\*.

\*\* The stable maintenance of the air vent nature of the above-mentioned \*\* can always be carried out by impressing an application-of-pressure fluid to the mold outside surface which consists of a porous body, and blowing off the blinding powder in the hole of a porous body in a mold at the time of being un-filled [ of fine particles ] up.

[0016] According to this invention according to claim 3, there is an operation of the following \*\*.

\*\* The air vent nature of the above-mentioned \*\* can be improved more by impressing an attraction fluid to the mold outside surface which consists of a porous body, and carrying out the forcible exhaust air of the air in a mold through the hole of a porous body at the time of restoration of fine particles, and shaping.

[0017]

[Example] The mimetic diagram in which drawing 1 shows the 1st example, the mimetic diagram in which drawing 2 shows the 2nd example, the mimetic diagram in which drawing 3 shows the 3rd example, and drawing 4 are the mimetic diagrams showing the conventional example.

[0018] (The 1st example) ( drawing 1 )

It has a mortar 11 and the up-and-down pestles 12 and 13, and is constituted, and after it fills up with fine particles the mortar 11 by which insertion arrangement was carried out in the pestle 13 the bottom in the predetermined location, the fine-particles compression-molding mold 10 inserts a pestle 12 into a mortar 11 a top, presses fine particles, it pushes up the mold goods by which compression molding was carried out out of a mortar 1 with a pestle 13 the bottom, and discharges them. in addition, the mortar 11 -- a mortar -- it is fixed to the fixed holder 14.

[0019] Here, if it is in a die 10, the whole containing \*\*\*\*\* 11A of a mortar 11 consists of metal-porous bodies 15. That is, a porous body 15 is opened directly [ atmospheric air ] or indirectly while it forms the inner surface of \*\*\*\*\* 11A of a mortar 11. And the porous body 15 is equipped with the hole which is open for free passage within and without a mortar 11, and makes the aperture of this hole smallness from fine-particles particle size.

[0020] Specifically, it is fine-particles mean particle diameter 100-200  $\mu\text{m}$  When carrying out, it is 1-10 micrometers about the average aperture of a porous body 15. It is suitable to make a void content (the total hole to the total surface area area comparatively) into 20 - 30%. As fine particles of the above-mentioned mean particle diameter, there is a bath liquid which makes a principal component a sodium hydrogencarbonate, a sodium carbonate, a succinic acid, and a fumaric acid, for example. Moreover, as the above-mentioned average aperture and a metal porous body of a void content, there is POSERAKKUSU II (trade name of Sintokogio, Ltd.), for example.

[0021] moreover -- if it is in a die 10 -- a mortar 11 and a mortar -- the pressure room housing 16 is sealed in the circumference of the soffit outside surface of the fixed holder 14, and the pressure room 17 is formed to the circumference of the soffit side of a mortar 11.

[0022] And the application-of-pressure air supply tubing 18 for impressing application-of-pressure air to the pressure room 17 and the attraction air supply tubing 19 for impressing attraction air to the pressure room 17 are connected.

[0023] The application-of-pressure air supply tubing 18 was equipped with the change-over valve 22 for making change-over connection of the application-of-pressure air generators 21, such as an air compressor, at the pressure room 17, and the attraction air supply tubing 19 is equipped with the change-over valve 24 for making change-over connection of the attraction air generators 23, such as a vacuum pump, at the pressure room 17.

[0024] Hereafter, the shaping actuation by the die 10 is explained.

(1) Insertion arrangement of the pestle 13 is carried out the bottom in the predetermined location in a mortar 11, and it is filled up with the fine particles of the specified quantity in a mortar 11.

[0025] (2) Insert a pestle 12 into a mortar 11 from a position in readiness a top, and press the above-mentioned fine particles. A pestle 12 is pulled back a top after this compression molding by the position in readiness besides a mortar 11.

[0026] (3) Push up the mold goods by which compression molding was carried out out of a mortar 11 with a pestle 13

the bottom, and discharge them. The predetermined location in a mortar 11 resets a pestle 13 the bottom after this mold-goods blowdown.

[0027] in addition, the thing for which the application-of-pressure air which the application-of-pressure air generator 21 generates at the time of being un-filled [ of the fine particles to a mortar 11 ] up is supplied to the pressure room 17 from the application-of-pressure air supply tubing 18 if it is in a die 10 -- the outside surface of a porous body 15 -- this application-of-pressure air -- impressing -- the hole of a porous body 15 -- inner blinding powder is blown off in a mortar 11.

[0028] Moreover, if it is in a die 10, at the time of restoration of the fine particles to a mortar 11, and shaping, by supplying the attraction air which the attraction air generator 23 generates to the pressure room 17 from the attraction air supply tubing 19, this attraction air is impressed to the outside surface of a porous body 15, and the forcible exhaust air of the air in a mortar 11 is carried out through the hole of a porous body 15.

[0029] In addition, the arrow head in drawing shows the flow of application-of-pressure air and attraction air. The air discharged from a mortar 11 at the time of shaping is not only discharged from the soffit side of a mortar 11 at the pressure room 17 side, but is directly discharged into atmospheric air from the upper bed side of a mortar 11.

[0030] Hereafter, an operation of this example is explained.

\*\* Since \*\*\*\*\* 11A of a mortar 11 was constituted from a porous body 15 equipped with the hole which may function as an air bleed hole, the air in fine particles can be directly discharged out of a mold 10 from the circumference of these fine particles. And since many holes are formed of a porous body 15, they can secure the high air vent nature according to the void content (the total hole to the total surface area of \*\*\*\*\* 11A area comparatively) of a mortar 11. Therefore, the compression-molding nature which does not produce a capping phenomenon is securable with high speed and a high compression ratio also about the bad fine particles of an air omission, or fine particles with many quantities of contained air.

[0031] \*\* As long as it constitutes \*\*\*\*\* 11A of a mortar 11 from a porous body 15 and fine particles are made to contact this porous body 15 directly, it is not necessary to restrain the physical relationship of the mortar 11 which constitutes a mold 10, and pestles 12 and 13 in a specific location, and it can be set up freely.

[0032] \*\* the outside surface of the mortar 11 which consists of a porous body 15 at the time of being un-filled [ of fine particles ] up -- application-of-pressure air -- impressing -- the hole of a porous body 15 -- the stable maintenance of the air vent nature of the above-mentioned \*\* can always be carried out by blowing off inner blinding powder in a mortar 11.

[0033] \*\* The air vent nature of the above-mentioned \*\* can be improved more by impressing attraction air to the outside surface of the mold 11 which consists of a porous body 15, and carrying out the forcible exhaust air of the air in a mold 10 through the hole of a porous body 15 at the time of restoration of fine particles, and shaping.

[0034] (The 2nd example) ( drawing 2 )

A different point from the die 10 of said drawing 1 has the fine-particles compression-molding mold 30 in having removed the pressure room 17 of the circumference of the soffit outside surface of a mortar 11, the application-of-pressure air supply tubing 18, and the attraction air supply tubing 19.

[0035] According to this die 30, since a mortar 11 consists of porous bodies 15, it has an operation of \*\* in said die 10, and \*\*. In addition, the arrow head in drawing shows the flow of blowdown air.

[0036] (The 3rd example) ( drawing 3 )

A different point from said die 10 has the fine-particles compression-molding mold 40 in having constituted having removed the pressure room 17 of the circumference of the soffit outside surface of a mortar 11, the application-of-pressure air supply tubing 18, and the attraction air supply tubing 19, and not only the mortar 11 but the pestles 12 and 13 by the metal porous body 15.

[0037] According to this die 40, it becomes what is extended at the time of shaping so that the air vent field which discharges the air in fine particles from the circumference of these fine particles to the exterior directly may be crossed to the perimeter of fine particles, and the air vent nature by having used the porous body 15 can be improved more. In addition, the arrow head in drawing shows the flow of blowdown air.

[0038] it may be alike, and an appropriate thing [ forming a mortar 11 and the whole pestles 12 and 13 in a porous body in each above-mentioned example ] may not be made indispensable in operation of this invention that what is necessary is just the thing of a mold which forms only \*\*\*\*\* by the porous body at least, but some of mortars 11 and pestles 12 and 13 may be formed in a porous body.

[0039] Moreover, in operation of this invention, an application-of-pressure fluid may be impressed to all of a part of not only outside surface of a mold but mold outside surfaces, or an attraction fluid may be impressed.

[0040] Moreover, in operation of this invention, a die may be constituted more like not only a thing but the concave and convex type which consist of a mortar and an up-and-down pestle.

[0041]

[Effect of the Invention] While facing pressing fine particles and making good air vent nature in fine particles



according to this invention as mentioned above, setting out of the physical relationship of the mortar which constitutes a die, and a pestle can be enabled freely.

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CLAIMS

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[Claim(s)]

[Claim 1] The fine-particles compression-molding mold and approach which are characterized by consisting of a porous body which \*\*\*\*\* equipped with the hole of a mold which is open for free passage within and without this mold at least in a fine-particles compression-molding mold.

[Claim 2] The fine-particles compression-molding approach characterized by impressing an application-of-pressure fluid to the mold outside surface which consists of a porous body at the time of being un-filled [ of the fine particles to a mold ] up in the fine-particles compression-molding approach using a fine-particles compression-molding mold according to claim 1, and blowing off the blinding powder in the hole of a porous body in a mold.

[Claim 3] The fine-particles compression-molding approach characterized by impressing attraction grain to the mold outside surface which consists of a porous body at the time of restoration of the fine particles to a mold, and shaping further in the fine-particles compression-molding approach according to claim 2, and carrying out the forcible exhaust air of the air in a mold through the hole of a porous body.

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